

CLAIM AMENDMENTS

1. (Currently Amended) A method for enabling a user to generate a schematic diagram on a computer system, the computer system comprising a display and an input device, the method comprising:

~~generating~~ processing a netlist of a schematic diagram, ~~the netlist~~ indicating connectivity of a plurality of components through connection lines, ~~providing to provide~~ a normal display mode in which at least a portion of the components are presented on the display, and connection lines corresponding to the displayed components are presented on the display;

providing a topology display mode in which the at least a portion of the components are presented on the display without the corresponding connection lines;

providing a component selection function that enables a user to utilize the input device to select a particular component;

providing a topology editing function that enables the user to utilize the input device to ~~modify~~ edit the schematic diagram by modifying the relative positioning, sizing and connectivity of a selected component, wherein the topology editing function is combinable with the topology display mode to enable the user to ~~edit~~ modify the relative positioning or sizing of the selected component without viewing the corresponding connection lines; and

providing automatic pin assignment and routing of the connection lines within the schematic diagram displayed in the normal mode according to the netlist;

wherein the user is capable of switching between the topology display mode and the normal display mode while editing the schematic diagram.

2. (Original) The method of claim 1 wherein the topology editing function changes the netlist to reflect corresponding changes made by the user to the relative positioning and connectivity of the components.

3. (Original) The method of claim 2 further comprising performing the automatic pin assignment and routing at a time that is after a change is made to the netlist and before entering the normal display mode.

4. (Currently Amended) The method of claim 1 further comprising ~~utilizing the netlist to classify each connection line~~ grouping connection lines into classes according to a driver/load characteristic of the each connection line.

5. (Currently Amended) The method of claim 4 further comprising providing an abstract display mode that presents on the display ~~zero or more abstract lines for a first component~~ representations of ones of said components and a plurality of abstract lines between component representations, each abstract line respectively indicating connectivity ~~of the first component with another component~~ of a corresponding one of said classes of connection lines between a first component and another of said components.

6. (Currently Amended) The method of claim 5 wherein each abstract line indicates a group of one or more connection lines ~~that have~~ having common driver/load characteristics.

7. (Original) The method of claim 6 further comprising providing abstract information on the display for an abstract line, the abstract information indicating the number of driver connection lines and load connection lines in the group of connection lines associated with the abstract line.

8. (Original) The method of claim 5 wherein the first component is the user-selected component.

9. (Original) The method of claim 5 wherein the abstract display mode is combinable with the topology display mode.

10. (Original) The method of claim 4 wherein the automatic pin assignment and routing of the connection lines comprises:

grouping together connection lines having common driver/load characteristics to form one or more routing groups;

for each routing group, utilizing a router to generate a routing line that routes between two components; and

splitting the routing line to provide a respective route and pin assignment for each connection line in the routing group.

11. (Original) The method of claim 10 wherein each connection line in each routing group shares the same driver component and the same load component.

12. (Original) The method of claim 10 wherein the netlist is modified to reflect the routing and pin assignment performed for each connection line.

13. (Original) The method of claim 1 wherein the topology editing function comprises a central template auto-arrange function that automatically arranges other components around a user-selected component according to the relative connectivity of the other components with the user-selected component.

14. (Original) The method of claim 1 wherein the topology editing function comprises a fan-in auto-arrange function that automatically arranges other components with respect to a user-selected component according to fan-in connectivity of the other components with the user-selected component.

15. (Original) The method of claim 14 wherein the user-selected component is placed in a right-most position with respect to the other components.

16. (Original) The method of claim 1 wherein the topology editing function comprises a fan-out auto-arrange function that automatically arranges other components with respect to a user-selected component according to fan-out connectivity of the other components with the user-selected component.

17. (Original) The method of claim 16 wherein the user-selected component is placed in a left-most position with respect to the other components.

18. (Original) The method of claim 1 wherein the topology editing function comprises a path auto-arrange function that automatically arranges user-selected components into a path structure, and arranges other components around the user-selected components according to the relative connectivity of the other components with the user-selected components.

19. (Original) The method of claim 1 further comprising:
providing a line selection function that enables the user to utilize the input device to select a particular connection line; and

providing a bus auto-arrange function that automatically arranges the components around a user-selected connection line according to the relative connectivity of the components with the user-selected connection line.

20. (Original) A computer system comprising a processor and memory, the memory holding a program adapted to perform the method of claim 1 and executable by the processor.

21. (Original) A computer readable media containing data that is adapted to be extractable for providing the program of claim 20.

22. (New) A method enabling a user to edit a netlist describing a schematic diagram of a circuit formed by a set of components having pins, wherein the netlist describes a shape

and a position within the schematic diagram representations of the components and indicates which component pins are interconnected by connection lines within the schematic diagram, the method comprising the steps of:

- generating a display of a topology display mode schematic diagram showing representations of the components of shape and relative position within the schematic diagram described by the netlist but without showing any of the indicated connection lines;

- altering the topology display mode schematic diagram in response to user input by one of adding a component representation to the schematic diagram, removing a component representation from the schematic diagram, altering a shape of a component representation in the schematic diagram, and altering a position of a component representation with the schematic diagram;

- automatically altering the netlist so that its description of the schematic diagram is consistent with the altered topology display mode schematic diagram to produce an altered netlist;

- generating a display of a normal display mode schematic diagram showing representations of the components of shape and relative position within the schematic diagram in accordance with the altered netlist and showing said connection lines;

- altering the normal display mode schematic diagram in response to user input by one of adding a representation of a connection line to the schematic diagram and removing a representation of a connection line from the schematic diagram; and

- automatically altering the netlist so that its description of the schematic diagram is consistent with the altered normal display mode schematic diagram.

23. (New) The method in accordance with claim 22 wherein the step of generating the display of the normal mode schematic diagram includes automatically routing each connection line within the display.

24. (New) The method in accordance with claim 22 wherein the step of altering the normal display mode schematic diagram in response to user input by one of adding and removing a connection line comprises automatically routing an added connection line within the displayed normal display mode schematic diagram.

25. (New) The method in accordance with claim 22 wherein the step of automatically altering the netlist so that its description of the schematic diagram is consistent with the altered topology display mode schematic diagram comprises altering the netlist to delete a description of a component representation removed from the topology display mode schematic diagram and to delete each indication of that component being interconnected by a connection line to any other component.

26. (New) The method in accordance with claim 22 wherein the step of altering the topology display mode schematic diagram in response to user input comprises automatically repositioning representations of components within the topology display mode schematic diagram relative to an order in which the netlist indicates component pins are interconnected by connection lines.

27. (New) The method in accordance with claim 22 further comprising the step of:

generating a display of an abstract schematic diagram showing representations of the components of shape and relative position within the schematic diagram in accordance with the altered netlist, showing a set of abstract lines interconnecting pins pairs of the component representations, wherein each abstract line interconnecting a pair of component representations represents a group of more than one of the connection lines interconnecting that pair of component representations.

28. (New) The method in accordance with claim 27 wherein the display of the abstract schematic diagram also includes an indication of a number of connection lines each abstract line represents.

29. (New) Computer-readable media containing software which, when read and executed by a computer causes the computer to carry out a method enabling a user to edit a netlist describing a schematic diagram of a circuit formed by a set of components having pins, wherein the netlist describes a shape and a position within the schematic diagram representations of the components and indicates which component pins are interconnected by connection lines within the schematic diagram, wherein the method comprises the steps of:

generating a display of a topology display mode schematic diagram showing representations of the components of shape and relative position within the schematic diagram as described by the netlist but without showing any of the indicated connection lines;

altering the topology display mode schematic diagram in response to user input by one of adding a component representation to the schematic diagram, removing a component representation from the schematic diagram, altering a shape of a component representation in the schematic diagram, and altering a position of a component representation with the schematic diagram;

automatically altering the netlist so that its description of the schematic diagram is consistent with the altered topology display mode schematic diagram to produce an altered netlist;

generating a display of a normal display mode schematic diagram showing representations of the components of shape and relative position within the schematic diagram in accordance with the altered netlist and showing said connection lines;

altering the normal display mode schematic diagram in response to user input by one of adding a representation of a connection line to the schematic diagram and removing a representation of a connection line from the schematic diagram; and

automatically altering the netlist so that its description of the schematic diagram is consistent with the altered normal display mode schematic diagram.

30. (New) The computer-readable media in accordance with claim 29 wherein the step of generating the display of the normal mode schematic diagram includes automatically routing each connection line within the display.

31. (New) The computer-readable media in accordance with claim 29 wherein the step of altering the normal display mode schematic diagram in response to user input by one of adding and removing a connection line comprises automatically routing an added connection line within the displayed normal display mode schematic diagram.

32. (New) The computer-readable media in accordance with claim 29 wherein the step of automatically altering the netlist so that its description of the schematic diagram is consistent with the altered topology display mode schematic diagram comprises altering the netlist to delete a description of a component representation removed from the topology display mode schematic diagram and to delete each indication of that component being interconnected by a connection line to any other component.

33. (New) The computer-readable media in accordance with claim 29 wherein the step of altering the topology display mode schematic diagram in response to user input comprises automatically repositioning representations of components within the topology display mode schematic diagram relative to

an order in which the netlist indicates component pins are interconnected by connection lines

34. (New) The computer-readable media in accordance with claim 29 wherein the method further comprises the step of:

generating a display of an abstract schematic diagram showing representations of the components of shape and relative position within the schematic diagram in accordance with the altered netlist, showing a set of abstract lines interconnecting pins pairs of the component representations, wherein each abstract line interconnecting a pair of component representations represents a group of more than one of the connection lines interconnecting that pair of component representations.

35. (New) The computer-readable media in accordance with claim 34 wherein the display of the abstract schematic diagram also includes an indication of a number of connection lines each abstract line represents.